

REMARKS

Claims 1-45 are pending in the application. Claims 1-2, 4-6, 8-15, 18-20, 23-37, 39 and 43 are currently amended. Claims 17 and 40 have been canceled herewith.

Drawings

The Examiner objected to the drawing. More specifically, the Examiner objected to Figure 10.

Applicant provides a replacement sheet included with the Response.

The replacement sheet includes an amended Fig. 10.

In the amended Fig. 10: "Acquisition of of a set of image" is replaced by "Acquisition of a set of image", Steps 1120 and 1140 of Fig. 10 are amended so as to make the steps legible, and a new step 1130 is added (as described in line 16 of page 15). It is respectfully maintained that Fig. 10 as currently amended is allowable.

Specification

The Examiner objected to the disclosure because of several informalities.

Applicant now amends the disclosure as follows:

- 1) In lines 10-11 of page 4: "(" is deleted.
- 2) In line 30 of page 4: "(He uses this word too often)" is deleted.
- 3) A period is inserted at the end of paragraph [0012].
- 4) In line 24 of page 7: "FIG. 8A" is amended to "FIG. 8B".
- 5) In lines 28-29 of page 15: "to select a procedure form a plurality of medical procedures supported by the software" is amended to "to select a procedure from a plurality of medical procedures supported by the software"

It is respectfully maintained that the disclosure as currently amended is allowable.

Claim Rejections – 35 USC 112

The Examiner rejected claims 24 and 29 under 35 USC 112, because the specification while being enabling for steps recited in claim 1, does not reasonably provide enablement for the further means plus function limitations of claims 24 and 29.

More specifically, the Examiner asserted that the specification does not disclose how to make and use the means plus functions within the method steps of claims 24 and 29.

Claims 24 and 29 are currently amended so as to recite: "The apparatus according to claim 23...", thus making each of claims 24 and 29 an apparatus claim dependent on independent apparatus claim 23.

It is respectfully maintained that claims 24 and 29 as currently amended are allowable.

The Examiner further rejected claims 9-11, 14-15, 18-19, 20-22, and 23-45 under 35 USC 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the applicant regards as the invention. Applicant now amended claims 9-11, 14-15, 18-19, 20-22, and 23-45, as follows:

- 1) Claim 9 is now amended, so as to depend on claim 8, which provides a sufficient antecedent basis for "said calibrating".
- 2) Claim 10 is now amended, so as to depend on claim 8, which provides a sufficient antecedent basis for "said calibrating".
- 3) Claim 10 is now amended, so as to depend on claim 8, which provides a sufficient antecedent basis for "said calibrating".
- 4) Claim 14 is now amended, so as to depend on claim 13, rather than on itself.
- 5) Claim 18 is now amended, so as to depend on claim 17, rather than on itself.
- 6) Claim 20 is now amended, so as to make clear whether the output images produced at this additional step are different from the output images produced at step c of claim 1.
- 7) Claim 23 is now amended, so as to recite "a desired result" rather than "said desired result".
- 8) Claims 25-28, 30, 35-36, 39-40, and 43 depend on claim 24. Claim 24 is currently amended so as to define "The apparatus according to claim 23..", thus providing a sufficient antecedent basis for the apparatus of claims 25-28,30,35-36,39-40, and 43.
- 9) Claim 29 is currently amended so as to depend on claim 23, which provides a sufficient antecedent basis for the apparatus of claims 29.
- 10) Claim 43 is now amended, so as to recite "means for producing and storing planning reports of plurality of alternatives", rather than "means for producing and storing output images and planning reports of plurality of alternatives".

It is respectfully maintained that claims 9-11, 14-15, 18-19, 20-22, and 23-45 as currently amended are now allowable.

The remaining claims mentioned in this section of the Office Action are believed to be allowable as being dependent on an allowable main claim.

Specification

The Examiner is thanked for making recommendations with respect to claims 20 and 43.

Claims 20 and 43, as currently amended, recite "said calibrated artificial elements" rather than "said artificial elements", as recommended by the Examiner.

Claim Rejections – 35 USC 102

The Examiner rejected claims 1-45 under 35 USC 102(e), as being anticipated by Krause et al, US Patent No. 6,711,432 B1, issued on March 23, 2004 and filed on October 23, 2000.

Favorable reconsideration of this rejection is respectfully requested since, as will be shown below, the above-amended claims are novel over the prior art cited by the Examiner.

As described in the background of the invention section, the present invention relates to methods and apparatus for pre-operative planning and simulation of an orthopedic surgical procedure.

More specifically, the methods and apparatus taught by the present application, use medical images of a patient's anatomical structure the orthopedic surgical procedure is to be performed on, for pre-operative planning of the orthopedic surgical procedure. During the pre-operative planning, there are produced output images and reports, to be used later, when the surgical procedure takes place.

By contrast, Krause et al, US Patent No. 6,711,432, as described in the field of invention section, relates to devices and methods for implementing computer-aided surgical procedures, and more specifically to devices and methods for implementing a computer-aided orthopedic surgery utilizing intra-operative feedback.

That is to say, Krause introduces devices and methods to be implemented intra-operatively, rather a method for planning the operation in advance of the orthopedic surgery.

Claim 1, as currently amended, defines a method for preoperative planning and simulating of an orthopedic surgical procedure to be performed on an anatomical structure, using medical images of the anatomical structure, comprising inter alia: a. obtaining and displaying the medical images of the anatomical structure ; b. segmenting the anatomical structure into segments in said medical images; and c. using the obtained medical images, planning the result of the orthopedic surgical procedure to be performed on the anatomical structure, so output images are produced, wherein the obtained output images comprise at least one feature selected from the group consisting of: a plurality of calibrated organs; a plurality of organ segments; a plurality of calibrated artificial elements; and at least one superposition of said calibrated artificial elements on said calibrated organs or organ segments.

As explained above, and defined by claim 1, the present invention introduces the novel and inventive idea of a method where medical images of an anatomical structure an orthopedic surgical procedure is to be performed on are obtained, displayed, segmented, and used for planning the result of the orthopedic surgical procedure to be performed on the anatomical structure.

For example, the present invention describes obtaining images of a broken bone in paragraph [0048]: "Reference is now made to FIG. 2A and FIG. 2B that are schematics of X-Ray images of different views of a broken bone. A broken bone is a common case of trauma. The X-Ray images of FIGS. 2A and 2B represent medical X-Ray images displayed on the display of the pre planning system of the present invention".

The obtained images of the broken bone are then segmented, and used for planning the results of the orthopedic surgery procedure, as described in paragraph [0050]: "FIG. 3A and FIG. 3B demonstrate the step of defining and marking a bone segment of the image that will be relatively moved on the display in order to simulate a different location of an organ. In the trauma case described here, it is desired to move a bone segment 310 of FIG. 3A and similarly the same bone segment 350 of FIG. 3B in order to reduce a bone fracture".

The planning may involve manual intervention of a medical expert, as described in paragraph [0051]: "The medical expert uses a standard interactive drag-and-drop capability to interactively move segment 410 on the display."

By contrast, Krause et al, US Patent No. 6,711,432, describes devices and methods for implementing a computer-aided orthopedic surgery utilizing intra-operative feedback. With Krause, medical images of a normal anatomical structure rather than of an anatomical structure, an orthopedic surgical procedure is to be performed on, are used. The medical images are taken from a variety of patients of different ages, genders, etc, and used to generate a template "normal" model. The "normal" model is used intra-operatively, to provide a feedback to the surgeon.

For example, Krause describes in column 5, line 61: "Initially, a 3D model of a "normal" or properly aligned reference bone may be generated. This "template bone model" or template bone model CAD data may be generated based on representative bone topographies from MRI or CAT data, or data from any other imaging technique. The template bone model may then be stored in a computer database for future access. The template bone model database preferably stores various different template bone models to be used for patients of different ages, genders, heights, and other characteristics."

However, Krause falls short of disclosing or even hinting at the idea of a method where medical images of an anatomical structure an orthopedic surgical procedure is to be performed on are obtained, displayed, segmented, and used for planning the result of the orthopedic surgical procedure to be performed on the anatomical structure, as taught by the present invention, and defined by claim 1.

It is thus believed that claim 1 is both novel and inventive over the prior art and respectfully maintained that the claim should be allowed.

Claim 23, as currently amended, defines an apparatus for pre planning and simulating of an orthopedic surgical procedure to be performed on an anatomical structure, using medical images of the anatomical structure, the apparatus comprising; a. segmenting means for defining and marking anatomical structure segments in the medical images of the anatomical structure; b. planning means for planning the result of said orthopedic surgical procedure to be performed on the anatomical structure, using the medical images of the anatomical structure, the planning means comprising means for producing output images; wherein said output images comprising at least one

feature selected from the group consisting of a plurality of calibrated organs; a plurality of organ segments; a plurality of calibrated artificial elements; and at least one superposition of said calibrated artificial elements on said calibrated organs and organ segments; c. a memory for storing said medical images and a desired result; and, d. a display for displaying said medical images and said output images;

It is thus believed that claim 23 is both novel and inventive over the prior art and respectfully maintained that the claim should be allowed.

The remaining claims mentioned in this section of the Office Action are believed to be allowable as being dependent on an allowable main claim.

All of the matters raised by the Examiner have been dealt with and are believed to have been overcome.

In view of the foregoing, it is respectfully submitted that all the claims now pending in the application are allowable.

An early Notice of Allowance is therefore respectfully requested.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Martin O. Moynihan", written in a cursive style.

Martin Moynihan
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Date: January 5, 2007

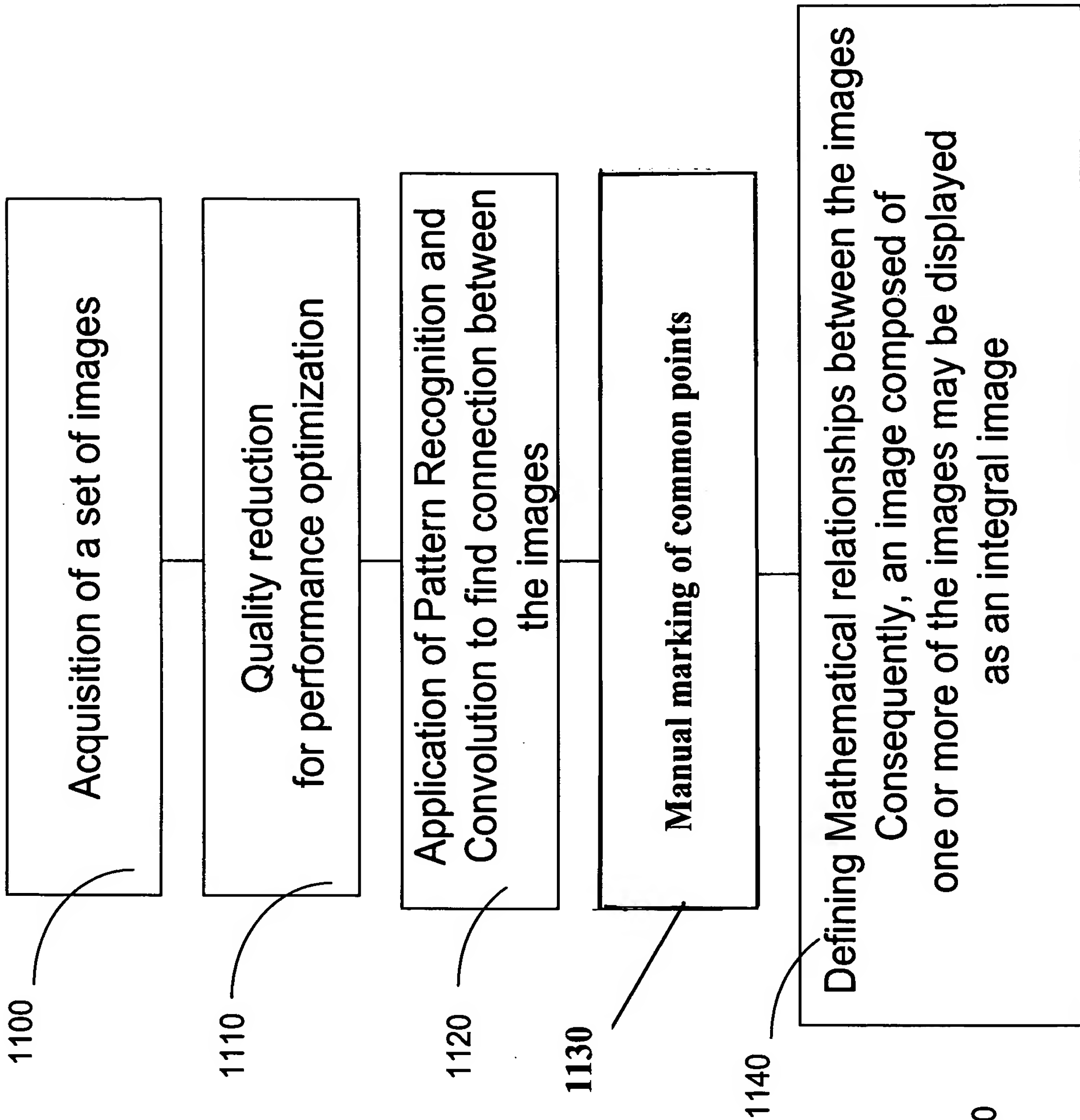


Fig. 10